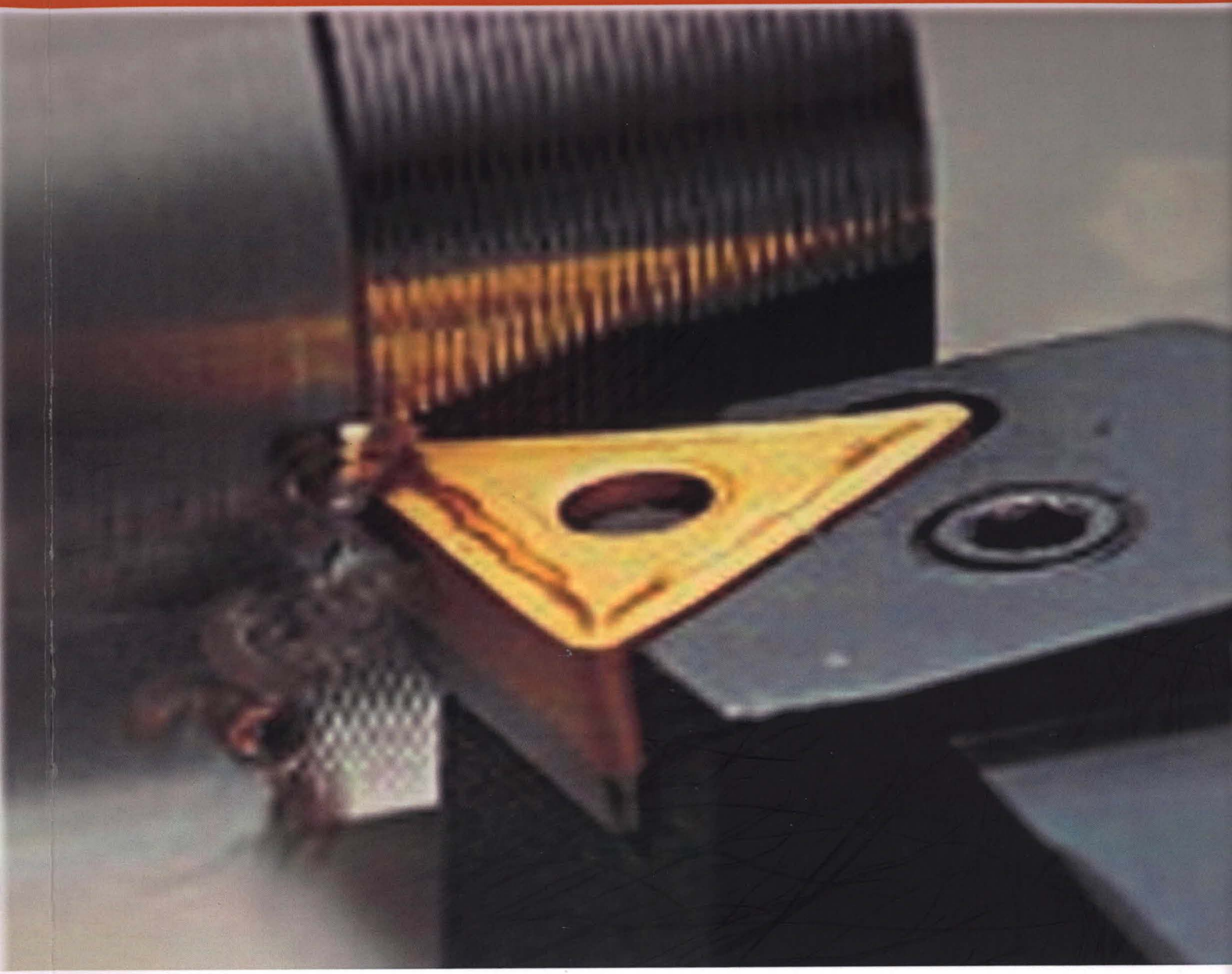

EDITOR

ERRY YULIAN TRIBLAS ADESTA

HIGH SPEED CUTTING

An Approach towards Improved Machining Performance

Manufacturing and Materials Department

Kulliyyah of Engineering

International Islamic University Malaysia

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An Approach towards Improved Machining Performance

EDITORS
ERRY YULIAN TRIBLAS ADESTA
AMIR AKRAMIN SHAFIE
AGUS GETER EDY SUTJIPTO
WAN AHMAD YUSMAWIZA

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EMAIL: iiumprinting@yahoo.com

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Mohammad Yuhan Suprianto [1] and Erry Yulian Triblas Adesta [2]
1, 2. Faculty of Engineering – International Islamic University Malaysia
✉ : yuhan.suprianto@gmail.com / ✉ : eadesta@iium.edu.my

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Afifah Mohd Ali [1] and Muhammad Riza [2]
1,2, Kulliyyah of Engineering, International Islamic University Malaysia
✉ : sakisakura@gmail.com / ✉ : muhammadriza@yahoo.com

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A.G.E. Sutjipto[1], A. Kaderi [2]
1,2, Kulliyyah of Engineering, International Islamic University Malaysia
✉ : agus@iium.edu.my

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Afifah Mohd Ali[1] and Erry Yulian Triblas Adesta[2]
Kulliyyah of Engineering, International Islamic University Malaysia
✉ : sakisakura@gmail.com / ✉ : eadesta@iium.edu.my

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Muataz Al Hazza[1] and Erry Yulian Triblas Adesta[2]
1, 2. Faculty of Engineering – International Islamic University Malaysia
✉ : mutaz_hazaa@yahoo.com /✉ : eadesta@iium.edu.my

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Suryanto
Kulliyyah of Engineering, International Islamic University Malaysia
✉ : surya@iium.edu.my

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Muataz Al Hazza[1] and Erry Yulian Triblas Adesta[2]
1, 2. Faculty of Engineering – International Islamic University Malaysia
✉ : mutaz_hazaa@yahoo.com / ✉ : eadesta@iium.edu.my

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Muataz Al Hazza[1] and Erry Yulian Triblas Adesta[2]
1, 2. Faculty of Engineering – International Islamic University Malaysia
✉ : mutaz_hazaa@yahoo.com /✉ : eadesta@iium.edu.my

Chapter Five

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A.G.E. Sutjipto[1], A. Kaderi [2]
Kulliyyah of Engineering, International Islamic University Malaysia
✉ : agus@iium.edu.my

5.1 Introduction

Until recently, the development of ceramic science and ceramic engineering has never been the same again. For the past 30 years the terms advanced ceramics has been as familiar as the term advanced metallic alloys. The rapid development of ceramic materials has not just limit their applications to silicate ceramics only but there are now more on structural ceramics.

Among the most studied structural ceramics is ceramics as cutting tools. The application of ceramics as cutting tools reasonably originates from the mechanical performances of the ceramics itself which could retain its mechanical performances at a very high temperature.

The term "cutting tool" in fact covers a very large variety of tools: turning tools, drill bits, planer tools and slotting tools, scraping or shaving tools, drill spindles, milling cutters, facing cutters, recessing tools, reamers, taps and dies, files and grinding wheels. In order for the cutting tool to be a good cutting tool it has to be able to sustain the rigors of the cutting action as follows:

- Wear, which takes place at the level of the cutting edge
- Heat, generated by the energy required for the formation and removal of chips of the material machined hence the temperature
- Inherent shocks in the cutting action.

To sustain these rigors [1], the tool should be made of material having the following main properties:

- Hardness (especially when hot) to combat the wear
- Resistance to the effects of temperature due to heat released